Selected papers presented at the conference on Membranes in Drinking and Industrial Water Production Paris, France, 3–6 October, 2000









CONTENTS

DESALINATION VOLUME 131

An outstanding feat of modern technology: the Mery-sur-Oise Nanofiltration Treatment	
Plant (340,000 m³/d)	
C. Ventresque, V. Gisclon, G. Bablon, G. Chagneau (Paris, France)	
Status after 10 years of operation — overview of UF technology today	17
JM. Laîné (Le Pecq, France), D. Vial (Richmond, VA, USA), P. Moulart (Rueil-Malmaison, France)	
UF/RO treatment plant Heemskerk: from challenge to full scale application	27
P.C. Kamp, J.C. Kruithof, H.C. Folmer (Velserbroek, The Netherlands)	
Design considerations for major membrane treatment facility for groundwater	37
W.B. Suratt (Ft. Lauderdale, FL, USA), D.R. Andrews (Boca Raton, FL, USA),	
V.J. Pujals (Ft. Lauderdale, FL, USA), S.A. Richards (Miami, FL, USA)	
Water recycling by floating media filtration and nanofiltration at a soft drink factory	47
H. Miyaki (Fujisawa, Japan), S. Adachi, K. Suda (Tokyo, Japan), Y. Kojima (Fujisawa, Japan)	
Recycling of washing waters from bottle cleaning machines using membranes	55
N. Scharnagl, U. Bunse, KV. Peinemann (Geesthacht, Germany)	
Water recycling using sequential membrane treatment in the electronics industry	55
M. Okazaki, M. Uraki, K. Miura, T. Nishida (Kanagawa, Japan)	
Reduction of water consumption and wastewater quantities in the food industry by water recycling	15
using membrane processes	
V. Mavrov, E. Bélières (Saarbrücken, Germany)	
Purification of copper wire drawing emulsion by application of UF and RO	\$7
K. Karakulski, W.A. Morawski (Szczecin, Poland)	
Desalination technology for optimal renovation of saline groundwater in a natural reservoir)7
A. Bick, G. Oron (Beer-Sheva, Israel)	
Using circulation tests to model natural organic matter adsorption and particle deposition by spiral-wound 10)5
nanofiltration membrane elements	
T.L. Champlin (Tampa, FL, USA)	
Simple technique for measuring the concentration polarization level in a reverse osmosis system	7
I. Sutzkover, D. Hasson, R. Semiat (Haifa, Israel)	
Improved performance of reverse osmosis with dynamic layers onto membranes in separation of	.9
concentrated salt solutions	
T.V. Knyazkova, A.A. Kavitskaya (Kiev, Ukraine)	_
Desalination in Morocco and presentation of design and operation of the Laayoune seawater reverse	1
osmosis plant	
H. Zidouri (Rabat, Morocco)	

Optimization of hybridized seawater desalination process	147
M. Al-Sofi, A.M. Hassan, O.A. Hamed, A.G.I. Dalvi, M.N.M. Kither, G.M. Mustafa,	147
K. Bamardouf (Al-Jubail, Saudi Arabia)	
A demonstration plant based on the new NF-SWRO process	157
A.M. Hassan, A.M. Farooque, A.T.M. Jamaluddin, A.S. Al-Amoudi, M.AK. Al-Sofi, A.F. Al-Rubaian, M.N.M. Kither, I.A.R. Al-Tisan, A. Rowaili (Al-Jubail, Saudi Arabia)	
Technical management of RO system	173
Samir El-Manharawy, Azza Hafez (Cairo, Egypt)	
Parameters affecting the properties of dynamic membranes formed by Zr hydroxide colloids	189
M. Rumyantsev, A. Shauly (Haifa, Israel), S.G. Yiantsios (Thessaloniki, Greece),	
D. Hasson (Haifa, Israel), A.J. Karabelas (Thessaloniki, Greece), R. Semiat (Haifa, Israel)	
Modified Fouling Index _{ultrafiltration} to compare pretreatment processes of reverse osmosis feedwater	201
Ś.F.E. Boerlage, M.D. Kennedy, M.p. Aniye, E.M. Abogrean, D.E.Y. El-Hodali, Z.S. Tarawneh,	
J.C. Schippers (Delft, The Netherlands)	
Fouling effects on rejection in the membrane filtration of natural waters	215
A.I. Schäfer, A.G. Fane, T.D. Waite (Sydney, Australia)	
The effect of shear rate on controlling the concentration polarization and membrane fouling	225
R. Bian, K. Yamamoto (Tokyo, Japan), Y. Watanabe (Sapporo, Japan)	
Comparison of the finished water quality among an integrated membrane process, conventional	237
and other advanced treatment processes	
HH. Yeh, I-C. Tseng, SJ. Kao, WL. Lai, JJ. Chen, G.T. Wang, SH. Lin (Tainan, Taiwan)	
Costs of conventional versus membrane treatment for karstic spring water	245
R. Pianta, M. Boller (Duebendorf, Switzerland), D. Urfer (Porrentruy, Switzerland), A. Chappaz,	
A. Gmünder (Winterthur, Switzerland)	
Comparison of NF/RO membrane performance in integrated membrane systems	257
M.M. Nederlof (Zwolle, The Netherlands), J.C. Kruithof (Bloemendaal, The Netherlands),	
J.S. Taylor (Orlando, FL, USA), D. van der Kooij, J.C. Schippers (Nieuwegein, The Netherlands)	
Combination of membrane technology and limestone filtration to control drinking water quality	271
R. Kettunen, P. Keskitalo (Tampere, Finland)	
Electrodialysis reversal (EDR) and ion exchange as polishing treatment for perchlorate treatment	285
V. Roquebert, S. Booth, R.S. Cushing, G. Crozes (Boise, ID, USA), E. Hansen (Magna, UT, USA)	
Effect of pH on the removal of arsenic and antimony using reverse osmosis membranes	293
M. Kang, M. Kawasaki, S. Tamada, T. Kamei, Y. Magara (Sapporo, Japan)	
New composite membrane for water softening	299
S. Bequet, T. Abenoza, P. Aptel (Toulouse, France), J.M. Espenan (Fourquevaux, France),	
JC. Remigy, A. Ricard (Toulouse, France)	
Coagulation – adsorption – ultrafiltration for wastewater treatment and reuse	307
D. Abdessemed, G. Nezzal (Algiers, Algeria), R. Ben Aim (Toulouse, France)	
Pilot study on renovation of subsurface water using a reverse osmosis desalting system	315
S. Ebrahim, Y. Al-Wazzan, M. Safar, N. Burney, A. Al-Mesri (Safat, Kuwait)	
Process water production from river water by ultrafiltration and reverse osmosis	325
M. Clever, F. Jordt, R. Knauf (Frankfurt, Germany), N. Räbiger, M. Rüdebusch,	
R. Hilker-Scheibel (Bremen, Germany)	
Surface water treatment with Zenon microfiltration membranes: minimisation of energy and chemical use	337
R.B. Klijn, W.G.J. van der Meer (Leeuwarden, The Netherlands), H. Vriezen,	
F.H.J. van Ekkendonk (Amersfoort, The Netherlands)	
Production of demineralized water out of rainwater: environmentally saving, energy efficient and	345
cost-effective	
H.A. Oosterom, D.M. Koenhen, M. Bos (Dedemsvaart, The Netherlands)	

N. Delgrange-Vincent, C. Cabassud, M. Cabassud (Toulouse, France), L. Durand-Bourlier, J.M. Laîné (Le Pecq, France)

DESALINATION VOLUME 132

Biofouling potential of chemicals used for scale control in RO and NF membranes	
J.S. Vrouwenvelder, S.A. Manolarakis, H.R. Veenendaal, D. van der Kooij (Nieuwegein, The Netherlands)	
Application of low fouling RO membrane elements for reclamation of municipal wastewater	11
M. Wilf, S. Alt (Oceanside, CA, USA)	
Flux enhancement of RO desalination processes	21
A. Abbas, N. Al-Bastaki (Bahrain)	
Effects of environment on source water for desalination plants on the eastern coast of Saudi Arabia	29
P.K. Abdul Azis, I. Al-Tisan, M. Al-Daili, T.N. Green, A.G.I. Dalvi, M.A. Javeed (Al-Jubail, Saudi Arabia)	
A design/build approach to deep aquifer membrane treatment in Southern California	41
W.R. Everest (Newport Beach, CA, USA), S.L. Malloy (Irvine, CA, USA)	
Reverse osmosis concentrate disposal in the UK	47
D. Squire (Peterborough, UK)	
Desalination of brackish fish pond effluents — pilot testing and comparative economic evaluation	55
of integrated UF-RO systems vs. conventional systems	
P. Glueckstern, M. Priel, A. Thoma, Y. Gelman (Tel Aviv, Israel)	
Direct nanofiltration or ultrafiltation of WWTP effluent?	65
J.O.J. Duin, L.P. Wessels, H.F. van der Roest, C. Uijterlinde, H. Schoonewille (Amersfoort,	
The Netherlands)	
Assessment of an integrated membrane systems for surface water treatment	73
K. Glucina, H. Alvarez, J.M. Laîné (Le Pecq, France)	
The application of acid free antiscalant to mitigate scaling in reverse osmosis membranes	83
A. Al-Rammah (Dhahran, Saudi Arabia)	. 05
Prevention of silica scale in membrane systems: removal of monomer and polymer silica	89
I. Bremere, M. Kennedy, S. Mhiyo, A. Jaljuli, GJ. Witkamp(Delft, The Netherlands),	. 0)
J.C. Schippers (Delft, Nieuwegein, The Netherlands)	
Monitoring scaling in nanofiltration and reverse osmosis membrane systems	101
C.A.C. van de Lisdonk (Nieuwegein, The Netherlands), J.A.M. van Paassen (Zwolle, The Netherlands),	101
J.C. Schippers (Delft, Nieuwegein, The Netherlands)	
Scaling control of RO membranes and direct treatment of surface water	109
P.A.C. Bonné, J.A.M.H. Hofman, J.P. van der Hoek (Vogelenzang, The Netherlands)	10)
Membrane chemical research: centuries apart	121
E.G. Darton (Berkshire, UK)	121
Photochemical modification of poly(ether sulfone) and sulfonated poly(sulfone) nanofiltration	133
membranes for control of fouling by natural organic matter	133
J.E. Kilduff, S. Mattaraj, J.P. Pieracci, G. Belfort (Troy, NY, USA)	
Seasonal variations of nanofiltration (NF) foulants: identification and control	143
N.G. Her, G. Amy, C. Jarusutthirak (Boulder, CO, USA)	143
Iowa's first electrodialysis reversal water treatment plant	161
I Have (Washington IA USA)	101

Recycling of water with canal water supplement at Artis Zoo, Amsterdam, by means of ultrafiltration	167
and reverse osmosis	
C. W. Aeijelts Averink, W. Buijs (Schiedam, The Netherlands)	1.50
Biofouling in RO membrane systems. Part 1. Fundamentals and control	173
M. Al-Ahmad, F.A. Abdul Aleem, A. Mutiri, A. Ubaisy (Riyadh, Saudi Arabia)	101
Predicting the performance of RO membranes	181
N. Al-Bastaki, A. Abbas (Bahrain)	100
Retention of herbicides and pesticides in relation to aging of RO membranes	189
P.A.C. Bonné (Vogelenzang, The Netherlands), E.F. Beerendonk (Nieuwegein, The Netherlands),	
J.P. van der Hoek, J.A.M.H. Hofman (Vogelenzang, The Netherlands)	105
Comparison of the electrodialytic properties of NiSO ₄ and NiCl ₂ : Influence of the salt nature	193
in electrodialysis **E. Baubidal (Batus, Algaria) M. Burnagu (Montrallian France)	
KE. Bouhidel (Batna, Algeria), M. Rumeau (Montpellier, France)	100
Concentration polarization in electrodialysis: Buffer solutions experimental method	199
KE. Bouhidel, K. Oulmi (Batna, Algeria)	205
Removal of pesticides residues in water using nanofiltration process	205
R. Boussahel, S. Bouland (Paris, France), K.M. Moussaoui (El Harrach, Algeria),	
A. Montiel (Paris, France)	211
Four years field experience with fouling resistant reverse osmosis membranes	211
S. Coker (Freeport, TX, USA), P. Sehn (Rheinmünster, Germany)	215
Studies on organic foulants in the seawater feed of reverse osmosis plants of SWCC	217
A.G.I. Dalvi, R. Al-Rasheed, M.A. Javeed (Al-Jubail, Saudi Arabia)	
Laboratory technique for predicting the scaling propensity of RO feed waters	233
A. Drak (Haifa, Israel), K. Glucina (Le Pecq, France), M. Busch, D. Hasson (Haifa, Israel),	
JM. Laîné (Le Pecq, France), R. Semiat (Haifa, Israel)	
Membrane replacement in desalting facilities	243
S.J. Duranceau (Orlando, FL, USA)	
Use of continuous electrodeionization to reduce ammonia concentration in steam generators	249
blowdown of PWR nuclear power plants	
C. Goffin, J.C. Calay (Linkebeek, Belgium)	
Determination of membrane properties for use in the modelling of a membrane distillation module	255
C.M. Guijt, I.G. Racz, T. Reith, A.B. de Haan (Enschede, The Netherlands)	
Desalination of sea water using nuclear heat	263
M.S. Hanra (Mumbai, India)	
Modular desalting for specialized applications	269
C. Harris (Yorktown, VA, USA)	
Desalination of seawater: an experiment with RO membranes	275
M.N.A. Hawlader, J.C. Ho, Chua Kok Teng (Singapore)	
Reverse osmosis of concentrated calcium sulphate solutions in the presence of iron (III) ions using	281
composite membranes	
A.A. Kavitskaya, T.V. Knyazkova, A.A. Maynarovich (Kiev, Ukraine)	
Nanofiltration for drinking water production from deep well water	287
A. Khalik (Bontang, Indonesia), V.S. Praptowidodo (Bandung, Indonesia)	
Starting procedure of high-pressure pump with de-rated motor for large scale SWRO trains	293
B. Liberman (Ra'anana, Israel), I. Liberman (Tel-Aviv, Israel)	
Investigation on purification of hydrochloric acid by membrane method	299
O.D. Linnikov, E.A. Anokhina, V.E. Scherbakov (Ekaterinburg, Russia)	

Desalination 131 (2000) Contents

ix

arsenic-contaminated groundwater J.-I. Oh, K. Yamamoto (Tokyo, Japan), H. Kitawaki (Gunma, Japan), S. Nakao, T. Sugawara (Tokyo, Japan), M.M. Rahman, M.H. Rahman (Dacca, Bangladesh) A.G. Pervov, E.V. Dudkin, O.A. Sidorenko, VV. Antipov, S.A. Khakhanov, R.I. Makarov (Moscow, Russia) Bontang, East Kalimantan V.S. Praptowidodo (Bandung, Indonesia), A. Khalik (Bontang, Indonesia) D. Sambrailo, J. Ivic (Dubrovnik, Croatia) R. Sheikholeslami, S. Zhou (Sydney, Australia) C.V. Vedavyasan (Mumbai, India) J. Wang, S. Wang, M. Jin (Tianjin, China) E.T. Ras (Tokyo, Japan), J.-J. Pomantoc (Quezon City, Philippines), E. Tumulak (Tokyo, Japan), R.T. Ras, P.R. Falar, J. Lelis (Butuan City, Philippines)

